

[1] MEMORANDUM FOR THE PRESIDENT

This memorandum is to report the status and results to date of the special review of space programs which we have been conducting with the National Aeronautics and Space Administration and the Department of Defense, and to present two policy questions on which your guidance is needed at this time:

1. The pace at which the manned lunar landing program should proceed, in view of the budgetary implications and other considerations; and

2. The approach that should be taken to other space programs in the 1964 budget, i.e., should they as a matter of policy be exempted from or subjected to the restrictive budgetary ground rules applicable in 1964 to other programs of the Government Decisions on specific programs. and the final amounts to be included in the 1964 budget can wait. However, advance decisions on the above two policy questions are essential to guide the preparation of refined estimates and specific recommendations, especially in the case of NASA.

The special space review

A special space review was begun last summer in response to your request that the space programs of all agencies be given an especially critical review and be presented to you as a whole. As a part of the 1964 budget preview process we arranged to have the tentative I-year space programs of NASA, Defense, the Atomic Energy

Commission, and the Weather Bureau, as they stood last August, laid out on a comparable basis in considerable detail for consideration and [2] review. Subsequently the agencies have made some significant revisions in the programs and cost estimates notably an upward revision in the cost estimates for the NASA manned lunar landing program and the agencies and the Bureau of the Budget have developed a variety of higher and lower alternative programs, have reviewed the more important individual programs, and have given special consideration to areas where the programs and interests of the agencies overlap.

The 1964 budget estimates of the agencies now under consideration reflect many of the results of the special review, and serve as a useful basis for the consideration of the various policy alternatives outlined below. A more detailed table is attached as an appendix.

Current Agency Estimates

New obligational authority - in billions

	1962	1963	1964	1965	1966	1967
Manned lunar						
landing program	\$1.3..	\$2.7 ..	\$4.6..	\$3.4 ..	\$2.6..	\$1.8All
other NASA5	1.0 ...	1.6 ...	2.6 ...	3.4 ...	4.2
Total, NASA	1.8 ...	3.7 ...	6.2 ...	6.0 ...	6.0 ...	6.0
Department of						
Defense	1.1	1.6	1.6	1.6*	1.6*	1.6*AEC
and Weather						
Bureau	.2	.3	.4	.4	.5	.5
Total NOA,						
all space programs	3.1	5.6	8.2	8.0	8.1	8.1
Total expenditures,						
all space programs	2.3	3.9	6.5	8.0	8.1	8.1

*Illustrative amounts; current estimates not yet projected by DOD

Manned lunar landing program

The question of the pace and budget level of the manned lunar landing program revolves around (1) the acceptability of both the schedule and funding [3] requirements of the program currently proposed by NASA; (2) the desirability, cost, and practical feasibility of measures that might be taken to accelerate the program, which have been set forth in a letter by Mr. Webb in reply to your question on the possibility of acceleration; and (3) the merits of lower alternatives which would delay the program to some degree but would ease the burden on the 1964 budget. There are three recent significant developments relating to the manned lunar landing program. One is that a firm decision has been reached to proceed with the "lunar orbit rendezvous" approach. As you know, Dr. Wiesner and his advisory committees have had strong reservations with respect to this approach and advocated further studies and reconsideration of other alternatives. After the latest round of studies and discussions, however, Dr. Wiesner has now agreed that while it might have been better to have concentrated on the earth orbit rendezvous or a 2-man direct ascent approach from the start, in the present circumstances the NASA decision to proceed with the EDR approach is appropriate and offers the best possibility for accomplishing the mission at the earliest practicable date. It is, however, desirable to continue the studies of the 2-man direct mode.

A second development is that NASA's latest estimates, based on the details of the LAP approach as they have now been worked out, indicate that substantially higher amounts would be required in 1963 and 1964 to keep the entire program on an optimum schedule--over \$400 million in 1963 above the amounts now appropriated and about \$550 million in 1964 above the initial LAP estimates last August. These revised estimates, reflected in the [4] alternatives below, accentuate the budgetary problem, and illustrate once again the tendency for repeated increases in estimated costs of large and complex development projects, while there are reasons to believe that the present estimates are much firmer than previous ones, we cannot with any confidence say that there will not be still further increases in this, without doubt, the largest and most complex single development project the nation has ever undertaken. Third, our understanding of the latest intelligence estimates is that there is no evidence yet that the Russians are actually developing either a larger booster of the size required for a manned lunar landing attempt or rendezvous techniques of the sort that would be required to assemble a manned lunar landing vehicle in earth orbit using their available boosters. While not conclusive, this suggests that extreme measures to advance somewhat our own target dates may not be necessary to preserve a good possibility that we will be first.

The range of possible alternatives is as follows As indicated in the explanations, all of the alternatives are not equally feasible and have not been worked out in the same detail. In all of the alternatives the "schedule" is to be understood as `the target

date established for program planning and estimating purposes, not as a forecast of when the first manned lunar landing attempts would actually be made. Experience has shown that on a realistic basis slippage of as much as a year must be anticipated. [5] Manned

Lunar Landing Program

	MLL target	NOA in billions				
		date	1963	1964	1965	1966
						1967
Alternative 1...late 1967	\$2.7 ..	\$4.6..	\$3.4	\$2.6		
\$1.8	Alternative 2 mid-1967.....	3.1 ..	4.6	3.2		
2.4	1.8	Alternative 3	late 1966 ..	3.6		
5.4	3.9	3.0 ...	1.0 ...	Alternative 4		
late 1968	2.7	3.7 ...	3.5 ...	2.7 ..	2.1	

Alternative 1. Assumes no 1963 supplemental and a late 1967 target date, which is regarded as the earliest feasible without a 1963 supplemental. It is included in NASA's current 1964 budget estimates as the alternative preferred by NASA on the basis of current policy guidance, recognizing the practical problems involved in getting timely approval of a 1963 supplemental authorization and appropriation. This alternative involves a sharp peaking of fund requirements in 1964, because the normal funding curves for all of the principal subprojects Gemini, Apollo, Advanced Saturn, etc.--have to peak in the same

year" in order to meet the assumed schedule. (There is some doubt whether the requirements in 1965 will drop as much as present estimates indicate.)

Alternative 2. Assumes a 1963 supplemental of about \$425 million with approval to proceed immediately on a deficiency basis in anticipation of the supplemental, and a mid-1967 target date. This is the "optimum" schedule referred to above. This alternative, which might accelerate the schedule by about 6 months, would require a strong presidential endorsement and the concurrence of congressional leaders and the appropriations committees with the decision to proceed on a deficiency basis. Because of the practical problems, it is not strongly advocated by Mr. Webb as the appropriate course for the administration to take.

[6] Alternative 3. Assumes a 1963 supplemental of \$900 million, approval to proceed on a deficiency basis in 1963, and a decision to proceed on an all-out "crash" basis. NASA estimates that these measures of maximum acceleration might advance the date of a first attempt by as much as one year. This alternative would also require strong Presidential endorsement and congressional concurrence. It would create enormous additional management problems, and in NASA's view and ours would not appear to offer enough assurance of actually advancing the date of a successful attempt to be worth the cost and other problems involved.

Alternative 4. This is an estimate of the minimum amount

(\$3.7 billion) that could be provided in 1964 and still accommodate a program based on a target date about one year later than alternative 1. A new detailed program would have to be worked out under these dollar and schedule assumptions, and there would be considerable dislocations in activities now underway in 1963. This alternative is significant as indicating probably about the lowest 1964 estimate under which the first actual manned lunar landing might still be expected to occur during this decade, after a realistic allowance for slippage. As such it could be regarded as being in accord with the announced administration policy of achieving a manned lunar landing before the end of this decade, It would also represent an approach to the manned lunar landing program more closely corresponding to the restrictive approach we are taking with respect to other parts of the 1964 budget.

I agree with Mr. Webb that alternative 1, the NASA recommendation, is probably the most appropriate choice at this time to press forward to achieve a manned lunar landing ahead of the Russians. While it will be criticized [8] in the meteorological and communications fields. Finally, there is the continuing research and development effort required to lay the technical foundation for and begin the development of engines and other components, space vehicles, and techniques for future manned and unmanned space flight.

There is no disagreement that work in all of these areas should continue and move forward on a progressive basis, with

appropriate decisions and coordination of the specific projects and areas of effort. The policy issue relates to the scale of effort and relative priority of the work.

There are essentially two alternatives, indicated by the following figures:

<u>Other NASA Programs</u>		
(Exclusive of amounts supporting manned lunar landing program)		
Illustrative	1964 NOA - in billions	
	NASA	
	proposal	alternate
Scientific investigations in space (communications & meteorology) supporting research and development.....	\$.6	\$.4
Applications.....		.2
Future capabilities.....	.8	.7
Total	1.6	1.3
.....		

NASA takes the view that the importance of maintaining the proposed general level of effort in the "other" areas is so great that if any reduction were to be made in the \$6.2 billion budget request, it should be applied at least in part to the manned lunar landing' program, in order to maintain a "balanced" total program. The Administrator and his principal assistants are fearful that the appeal and priority of the manned lunar landing program may turn NASA into a "one program agency" with loss of leadership and standing in the scientific community at home and abroad, and with inadequate provision [9] for moving ahead with developments required for future

capabilities in space. They point to the fact that to some extent the MLL and other programs are mutually supporting in a technical sense, although all scientific investigations and supporting research directly required for the manned lunar program have been identified and provided for in that program. While recognizing the force of these arguments, it seems to me that (1) as in other research and development programs, the level of effort to be carried forward is, within limits, essentially a matter of degree, and (2) the decision to proceed with the manned lunar landing program as a matter of high urgency has been a unique sort of national decision which does not automatically endow other space objectives and programs with a special degree of urgency. Rather, it seems to me the appropriate national policy is to attempt to maintain a reasonable degree of balance between the very costly space programs and research and development programs in other fields. Under the policies being applied to the 1964 budget, this would mean that the estimates for NASA programs other than the manned lunar landing should be treated on their merits in the same restrictive fashion as other programs. I feel that a restrictive approach is especially appropriate in 1964 in view of the tremendous peaking in 1964 fund requirements that will occur if alternative 1 is approved for the manned lunar landing program.

The practical effect on the 1964 budget of this policy difference is about \$300 million in NOA and about \$150 million

in expenditures. While these amounts seem small compared to the totals for the space program, they are large compared to most of the other possibilities of adjustment in the 1964 [10] budget. The difference is not greater because NASA's proposals had already deferred to 1965 or later years initiation of most of the major new development projects under consideration, largely for reasons of technical feasibility, partly in recognition of the major effort required in 1964 on the manned lunar landing program. Our recommendation should not be equated with a "no new starts" policy, since even under the restrictive approach we feel would be appropriate, the program would include initiation of additional satellites of types currently available, new types of experiments, and some new development projects, as well as continuation of work already underway.

Defense and other space programs

The space programs of Defense, AEC, and the Weather Bureau do not present policy issues requiring resolution in advance of the final 1964 budget decisions. In the case of Defense, the Secretary and his assistants have taken a restrictive approach in their reviews, based on the conclusion that there are no valid new military requirements which justify at this time a major expansion in the military space programs. Special attention is being given in the budget reviews to the necessity for proceeding with the Titan III and Dynasoar projects, and to the approach that should be taken in the development of communications satellite systems. The communications satellite

problem is complex, involving NASA, Defense, and prospectively the new corporation authorized at the last session of Congress. The alternatives and our recommendations on this matter will be presented to you at a later date.

[11] Financial summary

The financial effect on the 1964 budget of the policy alternatives that appear most pertinent on the basis of the foregoing discussion are summarized below. It should be recognized that all estimates shown are subject to further adjustment when the regular budget review is completed.

.....	<u>Fiscal Year 1964 - in billions</u>	
	Current agency estimates	Current BOB estimates
New Obligational Authority		
Manned lunar landing.....	\$4.6	\$4.6
Other NASA	1.6	1.3
Total NASA		
Defense space programs	1.6	1.6
AEC and Weather Bureau4	.4
Total NOA		
Expenditures		
Manned lunar banding	3.4	3.4
Other NASA	1.2	1.0
Total NASA		
Total Defense and other	1.9	1.9
Total expenditures	6.5	6.3

In closing, I should point out that under any alternative we will be faced with a large built-in further increase in expenditures in 1965 which we now tentatively estimate at about \$1.3 billion.

Director

Attachment

[12] SPACE ACTIVITIES OF THE U. S. GOVERNMENT
 Based on agency estimates as of November 9, 1962 - Subject
 to change as budget reviews proceed

	<u>New Obligational Authority -</u>				
	<u>in millions</u>				
.....	1963	1964	1965	1966	1967
National Aeronautics and Space Administration					
Manned Lunar Landing Program					
Spacecraft Development and Operations (Mercury, Gemini, Apollo, etc.)	\$703	\$1,536	\$1,101	\$978	
\$666Launch Vehicle and Engine Development (Saturn, Advanced Saturn, and their engines)	660	1,028	796	579	361
Engineering Support (Systems engineering, integration, and checkout; aerospace medicine; launch operations)			207	173	165
Supporting Scientific Investi- gations in Space (Unmanned lunar exploration, orbiting solar observatories, radiation and bioscience satellites, etc.)	291	411	356	299	216
Other Support (Supporting research and development; tracking networks; NASA personnel and operation of installations)	397	609	569	517	
316Construction (Launch, ground test, laboratory, and support fac.)	586	785	343	91	51
Total, MLL Program	2,709	4,613	3,372	2,637	1,775
Other NASA Programs					
Other space sciences programs (Geophysical and astronomical satellites and unmanned exploration of Venus and Mars)	353	590	629	655	
522Applications programs (Development of meteorological and communications satellites)	144	108	129	186	
.....			102		
.....				102	
Developments required for advanced manned space flight (Advanced engine development, nuclear rocket project, and studies of advanced manned space vehicles)	299	485	685	913	
.....			982		
Other supporting research					

(General space technology, aeronautical research, and research grants and facilities for universities)	203	343	359	394	
.....	430	Provision			for
unspecified new programs	-	-	811	1,293	
.....	2,189				
Total, Other NASA Programs	984	1,604	2,628	3,363	4,225
Total, NASA	3 693	6,217	6,000	6,000	6,000

Department of Defense

Navigation satellite development and operation	45	35	*	*	*
Communications satellite development	95	76	*	*	*
Dynasoar manned space flight experiments	130	125	*	*	*
Dynasoar support at Vela nuclear weapons test detection experiments	26	26	*	*	*
Discoverer program	130	79	*	*	*
Titan III launch vehicle development	261	330	153	29	3
Large solid rocket development	40	34	*	*	*
Atlantic Missile Range (portion estimated as applicable to space activities)	80	88	*	*	*
Space Tracking & detection systems	33	57	*	*	*
Minor projects, supporting research & development, laboratory operations, and miscellaneous	651	706	*	*	*
Total, Defense space activities	1,631	1,646	1,600	1,600	1,600

Atomic Energy Commission

Nuclear rocket development (Rover)	105	170	172	180	
170Space nuclear power development	95	128	187	214	
.....	204	Supporting activities			
.....	12	21	24	29	
.....	29				

Total, AEC apace activities	212	319	383	423	403
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Weather Bureau

Operational meteorological satellite system & related meteorological research	43	41	60	60	60
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TOTAL, all space activities	5,579	8,223	8,043	8,083	8,063
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*Current estimates not yet projected for all items by Defense;
total shown is illustrative only.